UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

MEMORANDUM

SEPTEMBER 30, 1997

SUBJECT: Five-Year Review
Amincola Dump
Chattanooga, TN

FROM: Robert Jourdan, Chief
North Site Management Branch

THRU: Jewell Harper, Associate Director
Waste Management Branch

TO: Richard D. Green, Acting Director
Waste Management Branch

The subject report has been prepared in accordance with Office of Waste and Emergency Response Directives 9355.7-02 (May 23, 1991) and 9355.702A (July 26, 1994). The directives call for review of a site every five years after a Remedial Action to evaluate the remedy. This document presents the current conditions at the Site and makes recommendations regarding Operation and Maintenance activities and future reviews. Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, requires that if a remedial action is taken that results in any hazardous substances, pollutants, or contaminants remaining at a site, the Environmental Protection Agency (EPA) shall review such remedial action no less often than five years after initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

On-Site excavation of contaminated soil and debris started on August 5, 1993 and the material was shipped off-site. Upon the completion of the remedial action at the Site, a total of fourteen quarterly groundwater monitoring events were conducted. The Site continues to be protective of human health and the environment.

This document was drafted by EMPE Inc., environmental consultants to the responsible parties, and finalized by EPA Region 4. This document was reviewed by EPA Region 4 staff and the State of Tennessee. Upon approval of this document by Region 4 Waste Division Director, EPA will cease the groundwater monitoring program.

Approved by: _____ Date: 9/30/97
Richard D. Green, Acting Director
Waste Management Division, EPA Region 4

3/29/95 3/29/95 3/30/95

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 4, conducted policy review of the subject Superfund site pursuant to CERCLA Section 121(c), NCP Section 300.400(f)(4)(ii), and OSWER Directives 9355.7-02 (dated May 23, 1991), and 9355.7-02A (dated July 26, 1994). The purpose of a Five-Year Review is to ensure that the implemented remedial action remains protective of human health and the environment and is functioning as designed. This review (Type I) is applicable to a Site at which a response action has been completed and will become part of the Site file.

1.1 Site Location and Description

The Amnicola Dump Site ("the Site") is located in the southwest corner of Hamilton County, Tennessee at 35°04'05" north latitude and 85°16'39" west longitude. The Site is situated on the east side of the Tennessee River near river mile marker 466, in the city of Chattanooga, Tennessee. Principal access to the Site is from the Amnicola Highway (State Route 58). A topographic map of the Site is provided as Figure 1.

The Site consist of approximately 18 acres of gently sloping river bottom land with surface drainage westward toward the Tennessee River. Figure 2 shows the property boundaries, well locations, and the area of remedial excavation. The Site is located in a heavily industrialized area. The property is surrounded on the north, east and south by chain-link fencing; it is bounded on the west by the Tennessee River. There are currently no structures located on the Site. The Site is predominantly covered with dense vegetation and grasses.

The Site is bordered on the north by dense vegetation, on the east by Old Curtain Pole Road and the Amnicola Highway, on the south by Syn-Air Research, and on the west by the Tennessee River.

1.2 Site Characteristics

The Site is situated in the Ridge and Valley geologic physiographic province of Tennessee and is located within the 100-year floodplain of the Tennessee River. The Site overlies an apparent contact between the Knox and the lower portion of the Chickamauga Limestone. Depth to bedrock at the Site ranges from 32 to 64 feet. The bedrock is overlain by unconsolidated Quaternary Age alluvial sediments. The sediments primarily consist of silts, clays and sands. These sediments can be categorized into two fairly distinct Units. The uppermost unit, being 15 to 30 feet in thickness, consist primarily of sandy clayey silts. The unit immediately overlying the limestone bedrock, being 2 to 22 feet thick, consists of sandy clayey silts and silty sands with interbedded sand lenses. The uppermost aquifer is contained in both of these units. Groundwater from this aquifer is not utilized for domestic or industrial use.

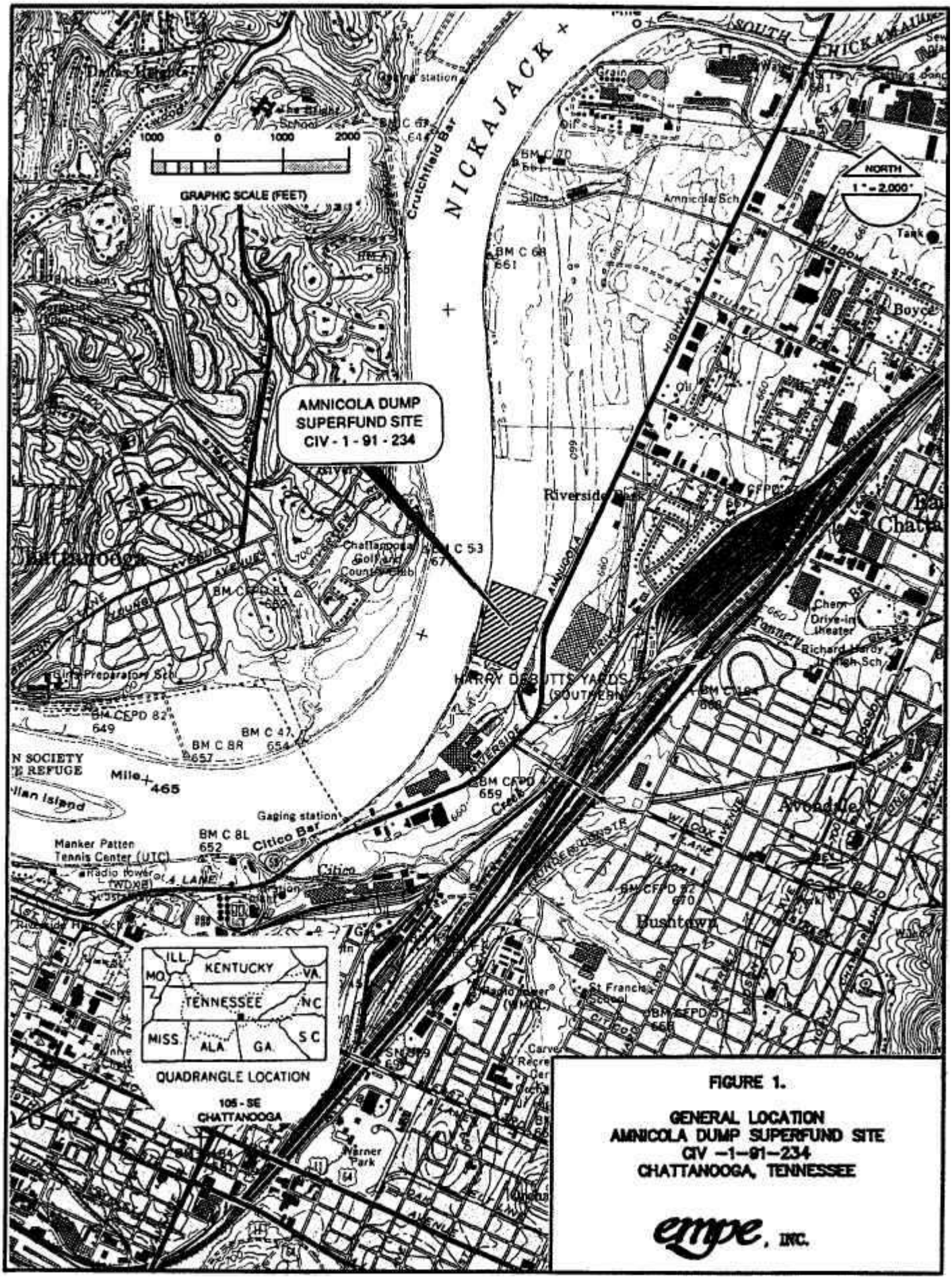
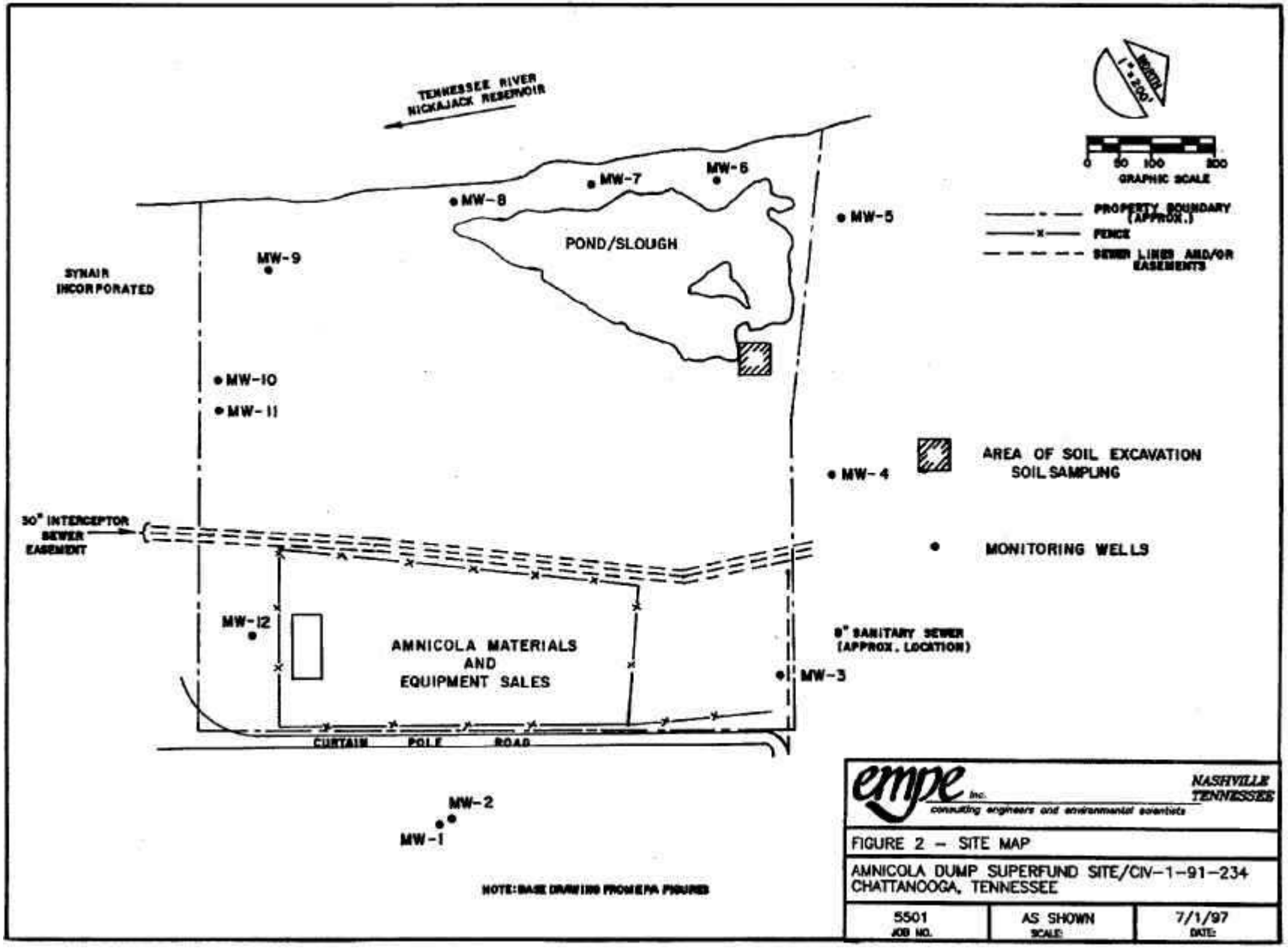


FIGURE 1.

GENERAL LOCATION
AMNICOLA DUMP SUPERFUND SITE
CIV -1-91-234
CHATTANOOGA, TENNESSEE

empe, INC.



empe inc. consulting engineers and environmental scientists — NASHVILLE TENNESSEE

FIGURE 2 – SITE MAP

AMNICOLA DUMP SUPERFUND SITE/CIV-1-91-234
CHATTANOOGA, TENNESSEE

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1.3 Site History

The Amnicola Dump Site was initially used for surface clay mining operations in the 1930's. These operations resulted in several water-filled pits along the western boundary of the Site in the present-day pond area. During the period 1957-1964, construction debris and other unidentified waste were occasionally disposed in many of the pits. This resulted in a large portion of the pits being filled.

From 1964 to 1970 the area was re-vegetated. The Amnicola Site was then operated as a dump from mid-1970 to September 1973 by the City of Chattanooga. Construction debris with 25% or less household waste, was disposed on-site during this period. A substantial portion of wood waste brought on-site was incinerated by an air-curtain destructor. The ashes resulting from the incineration process were then disposed of on-site. Approximately 12 acres of the 18-acre site were eventually filled.

Consolidated Latex, Inc., formerly located on the south border of the Site, allegedly disposed of latex waste in the pond area at the Site. In 1971, the Tennessee-American Water Company noted the dumping of the latex waste at the Site as well as the presence of a strong styrene-like odor during one leachate sampling event. Concern arose because of the proximity of the water company's intake, 0.5 miles downstream, to this leachate stream and latex dumping location. (Latex waste is the only industrial waste reportedly disposed at the Site).

In June 1971, the Tennessee Division of Solid Waste Management (DSWM) recommended closure of the dump. The recommendation was based on unauthorized wastes from garbage trucks being dumped in the water filled pits.

In May 1972, U.S. EPA provided the City of Chattanooga with recommended actions required to eliminate the discharge of leachate from the Site into the Tennessee River. Elevated levels of iron, manganese, total Kjeldahl nitrogen, and total organic carbon were detected in the leachate stream. EPA recommended closure of the Site. During the summer of 1973, the City finalized closure which included the placement of final soil cover, grading slopes, filling depressions, draining standing water, placing rip-rap along the western perimeter, construction of drainage ditches, and seeding the entire surface area of the fill.

From 1971 through 1976, the Tennessee-American Water Company conducted weekly leachate analysis for inorganic constituents on the stormwater runoff entering the river from the Site. Analysis included heavy metals, manganese, iron, and specific conductance. Little or no pattern in the parameter concentrations was apparent. Conductivity values were elevated and some metals were detected, but not elevated significantly above background levels.

In July 1979, EPA, Tennessee Department of Health and Environment (TDHE) personnel and local officials conducted a site visit. According to the trip report, the overall condition of the site was good. However, there was some discoloration of water observed in the drainage ditch. EPA recommended an evaluation of the historical water data and suggested that further water sampling be conducted.

In May 1982, MCI/Consulting Engineers, as a contractor to the TDHE, conducted a study of the leachate originating from the Site. The sampling point was a combined leachate stream located approximately 20 feet from the confluence with the Tennessee River.

The Amnicola Dump Site was proposed for inclusion on the National Priority List (NPL) in December 1982. The Site was finalized on the NPL in September 1983. The primary factor contributing to the HRS Mitre Ranking was the proximity of the Site to Chattanooga's water intake.

In December 1986, EPA Region 4, noted that site conditions varied from previous reports. EPA reported that the Site was currently being used as a storage area for heavy equipment, railroad ties, scrap metal, and large dumpsters. The cap had been cleared of vegetation, much of the rip-rap along the bank of the river had been removed, and leachate was noted in the southwestern corner of the Site.

In January 1987, EPA Region 4, Environmental Service Division (ESD) sampled leachate and surface drainage at the Site. The analytical results indicated that leachate streams contained elevated levels of 10 inorganic compounds and several trace organic compounds were also detected. ESD concluded that, based on the results of the finished water sample collected from the Tennessee-American Water Treatment plant, no impact on the Chattanooga water supply from the Site was evident.

In July 1987, EPA Region 4 personnel initiated the Remedial Investigation (RI) and Feasibility Study (FS) of the Site. The field investigation portion of the RI, was performed between January and March 1988. As part of the RI a total of 80 soil samples were collected from the site and eleven groundwater monitoring wells were installed. As a result of the RI, a portion of the Site was recommended for remediation due to high concentrations of six polyaromatic hydrocarbons (PAH) compounds detected in one isolated area. Both the RI and FS Reports were submitted in draft form to the public information repository in Chattanooga, Tennessee in January 1989.

The Record of Decision (ROD) was finalized on March 30, 1989 and was published and released to the public on April 10, 1989. In the ROD, the EPA selected Solidification/Fixation as the remedial alternative for the remediation of approximately 400 cubic yards of contaminated soil. Furthermore, the ROD directed that quarterly groundwater monitoring be conducted for the following parameters: caprolactum, diethyltetrahydrofuran, chloroform, bromodichloromethane, ethyl ether, chromium, bis(2-

ethylhexyl)phthalate and Bis(dimethylethyl)methylphenol. The ROD also established Alternate Concentration Limits (ACLs) for these same groundwater parameters. The U.S. EPA issued an Explanation of Significant Differences in the August 1993. During the Remedial Design in 1992, EPA required the PRPs to take additional samples to further define the extent of PAH contaminated soil. The data revealed that the PAH contamination was less extensive than originally estimated. Based on this data, the contaminated soil was disposed off-site.

On January 14, 1992, the Remedial Design Work Plan for the Site was submitted to the EPA Region 4 by Philip A. Lutin/Consulting Engineer. The work plan provided a summary of the Site's history and a description of the selected remedial action for the Site. The plan was approved by EPA Region 4 on January 27, 1992.

The groundwater Monitoring Plan for the Site was submitted by EMPE, Inc. in July 1992. The plan identifies six on-site wells which will be monitored quarterly for the presence of caprolactum, diethyltetrahydrofuran, chloroform, bromodichloromethane, ethyl ether, chromium, bis(2-ethylhexyl)phthalate and Bis(dimethylethyl)methylphenol. The plan also describes the protocols and methodologies to be utilized for groundwater sample collection and analysis.

The Sampling and Analysis Plan, Health and Safety Plan and Treatability Study Work plan were submitted to EPA Region 4 on October 2, 1992 by Philip A. Lutin/Consulting Engineer. These plans received EPA approval on October 8, 1992.

Additional soil sampling events were conducted at the Site by Philip A. Lutin/Consulting Engineer on January 13 & 14, 1993, April 1, 1993 and June 21, 1993. The analytical results of these samples indicated that the area requiring remedial action was much smaller than was identified in the ROD.

On July 21, 1993 Philip A. Lutin/Consulting Engineer submitted the Remedial Design and Remedial Action Work Plan for the Site to EPA Region 4. The selected remedial alternative for the site was changed in this work plan to excavation and removal, in lieu of the information obtained from the 1993 sampling events. Authorization to proceed with the work plan was granted on July 29, 1993.

Contaminated soil was excavated and shipped to the USPCI Lone Mountain Facility in Waynoka, Oklahoma on August 5, 1993. Site verification soil sampling was also conducted on this date.

EPA Region 4 granted approval to close the excavation on August 30, 1993. The excavation was backfilled and compacted with crusher run stone and graded to provide positive drainage on September 2, 1993. EPA Region 4 representatives were present to conduct final Remedial Action Inspection.

EMPE began quarterly groundwater monitoring of the Site in November 1993.

The Amnicola Dump Site was deleted from the National Priorities List (NPL) on May 15, 1996.

Region 4 EPA representatives conducted a Five-Year Review site inspection on May 8, 1997.

2.0 DISCUSSION OF REMEDIAL OBJECTIVES

The remedial objectives as defined in the March 30, 1989 ROD for the Amnicola Site include the following: (1) The control or treatment of contaminated soil to mitigate the current and potential pathways of contamination; (2) provide for groundwater monitoring of the Site until the implementation of the Five-Year Review.

2.1 ARAR Review

Currently there are no Federal or Tennessee drinking water regulations for seven of the contaminants listed in the ROD: caprolactum, diethyltetrahydrofuran, chloroform, Bromodichloromethane, ethyl ether, bis (2-ethylhexyl) phthalate, and bis (dimethylethyl) methylphenol. However, a maximum contaminant level (MCL) of 0.100 mg/l does exist for chromium.

Alternate Concentration Limits (ACLs) for groundwater at the Site were specified in the ROD. The ACLs for the Site represent a one order-of-magnitude increase in the maximum concentration of contaminants observed in the groundwater samples collected during the Site's remedial investigation. The resulting concentrations in the Tennessee River following groundwater discharge into the water body would be imperceptible . (The purpose of the one order-of -magnitude increase is to prevent unnecessary remedial action in ground water due to seasonal fluctuations in groundwater quality.) The following is a list of the established ACLs for the groundwater monitoring parameters.

Contaminant	**ACL**
Caprolactum	0.020 mg/l
Diethyltetrahydrofuran	0.300 mg/l
Chloroform	0.086 mg/l
Bromodichloromethane	0.046 mg/l
Ethyl Ether	0.050 mg/l
Chromium	0.890 mg/l
Bis (2-ethylhexyl) phthalate	3.700 mg/l
Bis(dimethylethyl) methylphenol	0.100 mg/l

2.2 Summary of Site Conditions

Since the completion of the remedial action at the Site, a total of fourteen quarterly groundwater monitoring events have been conducted. These monitoring events consists of purging, sample collection and analysis of groundwater collected from monitoring wells MW-2, MW-5, MW-6, MW-7, MW-8 and MW-9 in accordance with the approved Groundwater Monitoring Plan for the Site. In addition to groundwater monitoring, upstream and downstream water samples have been routinely collected from the Tennessee River during the last eleven monitoring events. The samples collected from the monitoring wells have been analyzed for the parameters of concern specified in the ROD. River samples were analyzed only for total chromium.

With one exception, the only parameter identified during the quarterly monitoring events is chromium. The single exception is bis (2-ethylhexyl) phthalate, which was detected at 0.259 mg/l in a groundwater sample collected on January 25, 1996 from MW-2. (MW-2 is an upgradient offsite well.) It is believed that the occurrence of this parameter resulted from field or laboratory contamination.

Throughout the course of the groundwater monitoring events at the Site, chromium has been detected at times in every well, in addition to the river samples. However, there has been no detection of chromium neither in the groundwater monitoring wells nor river samples in the last three quarterly monitoring events.

The highest concentration of chromium detected in any of the wells was 0.029 mg/l in the sample collected from MW-9 in April 1994. (This concentration is significantly less than the 0.890 mg/l ACL for chromium established in the ROD. Furthermore, the detection of chromium in this sample is an order-of-magnitude less than the more stringent Drinking Water Standard for chromium of 0.100 mg/l.)

A tabulation of the analytical results for chromium in groundwater for each of the fourteen quarterly monitoring events is presented in Table 1. These same data are graphically illustrated in the attached Figures 1 through 8.

2.3 Areas of Non-compliance

No areas of non-compliance have been identified since the remedial action was implemented at the Site. An inspection of the capped excavation during the Five-Year Review site visit found the cap to be intact and undisturbed. Laboratory analysis of quarterly groundwater samples has consistently demonstrated that the levels of the target contaminants are significantly below the ACLs established for this Site.

3.0 RECOMMENDATIONS

Based upon the analytical data generated over the fourteen quarter groundwater monitoring period, it is recommended that monitoring activities cease at the Amnicola Dump Site. Analytical data collected from this Site indicate that the only parameter of concern which has been detected during these monitoring events is chromium. Furthermore, the levels at which chromium has been detected are greater than an order-of magnitude less than the ACL established for this metal and significantly less than the Drinking Water Standard of 0.100 mg/l. Moreover, there has been no detection of chromium in any well or river sample during the last three quarterly monitoring events.

4.0 STATEMENT OF PROTECTIVENESS

As discussed above, the remedial action at the Amnicola Dump Site, as prescribed in the ROD, is completed. Inspection of the protective cap covering the area of the remedial soil excavation indicates that it is functioning as designed. Analytical data from groundwater and river samples indicated that levels of the contaminants of concern are below the quantification limit for all parameters except chromium. When detected in the samples, chromium levels have consistently been below the ACL established for the Site and below the more stringent Drinking Water Standard. This remedial action and associated groundwater monitoring is believed to be protective of human health and the environment.

5.0 NEXT FIVE-YEAR REVIEW

All surface soil above the cleanup goal has been removed from the Site, therefore, Operation and Maintenance (O&M) was not required for soil. Furthermore, Site Institutional Controls were defined in the Consent Decree, and required the PRPs to place deed restrictions on the property. The deed restrictions were recorded with the office of Hamilton County Register on October 16, 1991. Finally, groundwater sampling initiated in 1993 has demonstrated that groundwater contamination levels have attenuated well below MCLs. There is no ongoing remedial action(s) at the Site as set forth in the ROD. Based on the analytical data generated from the quarterly groundwater monitoring, there is no need for further five-year evaluations of the Site.

Amnicola Dump Site Chromium Levels

Table 1

MW-2 Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)	*<0.005*	*<0.005*	*<0.004*	*<0.010*	*<0.010*	*<0.004*	*<0.005*	*0.006*	*<0.005*	*<0.004*	*0*	*0*	*0*	*0*
PQL	*0.005*	*0.005*	*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*

MW-5 Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)	*<0.005*	*0.006*	*<0.004*	*<0.010*	*<0.010*	*<0.004*	*<0.005*	*0.006*	*<0.005*	*<0.004*	*0*	*0*	*0*	*0*
PQL	*0.005*	*0.005*	*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*

MW-6 Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)	*<0.005*	*<0.005*	*<0.004*	*<0.010*	*<0.010*	*<0.004*	*<0.005*	*0.006*	*<0.005*	*<0.004*	*0*	*0*	*0*	*0*
PQL	*0.005*	*0.005*	*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*

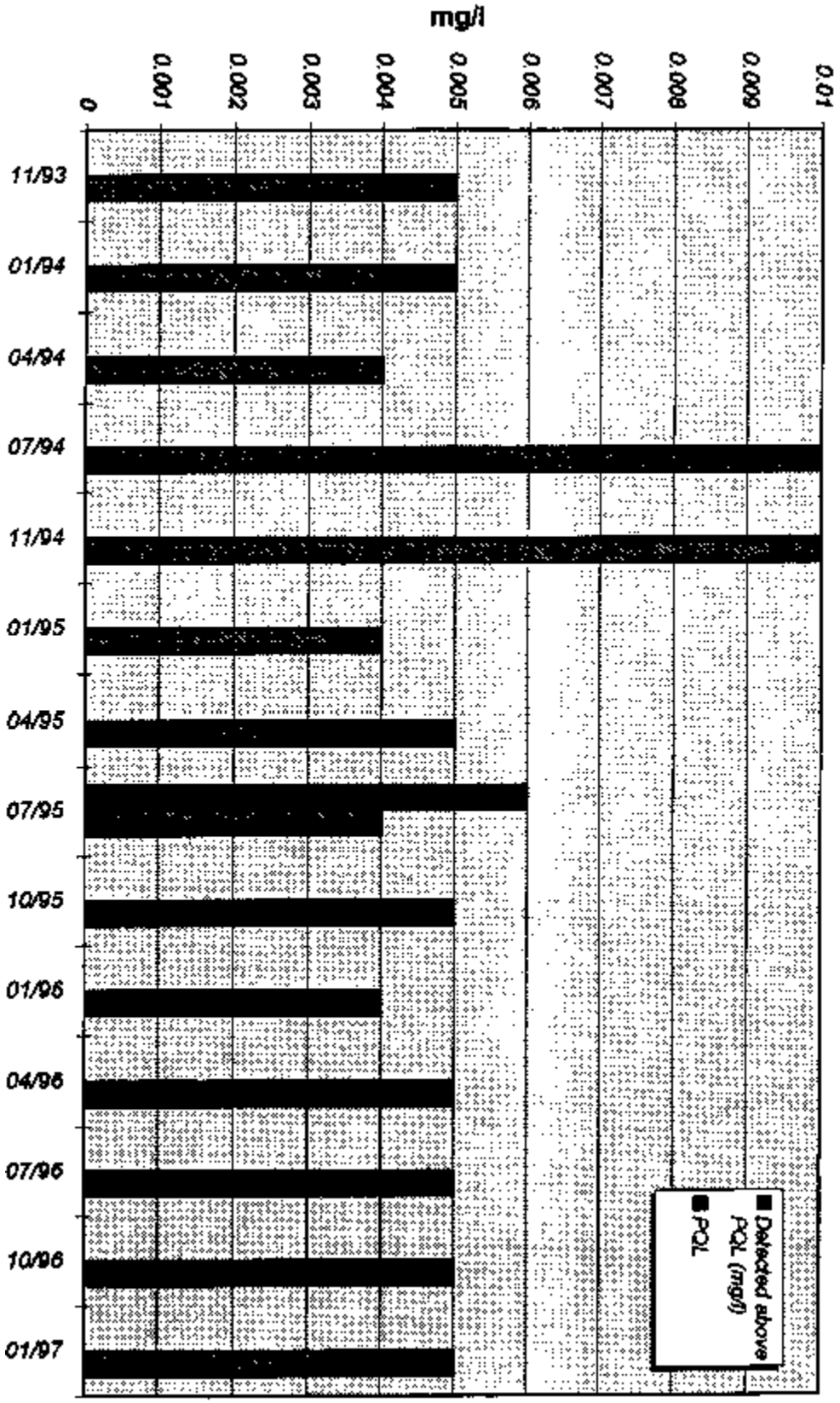
MW-7 Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)	*0.007*	*<0.005*	*<0.004*	*<0.010*	*0.013*	*0.021*	*0.012*	*0.019*	*0.008*	*<0.004*	*0*	*0*	*0*	*0*
PQL	*0.005*	*0.005*	*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*

MW-8 Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)	*<0.005*	*0.006*	*<0.004*	*<0.010*	*<0.010*	*0.005*	*<0.005*	*0.008*	*<0.005*	*<0.004*	*0*	*0*	*0*	*0*
PQL	*0.005*	*0.005*	*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*

MW-9 Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)	*<0.005*	*0.022*	*0.029*	*<0.010*	*<0.010*	*0.007*	*0.008*	*0.011*	*0.006*	*0.007*	*0.006*	*0*	*0*	*0*
PQL	*0.005*	*0.005*	*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*

TN River Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)			*0.03*	*<0.010*	*<0.010*	*<0.004*	*<0.005*	*0.005*	*<0.005*	*<0.004*	*0*	*0*	*0*	*0*
PQL			*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*

TN River Sample Date	11/93	01/94	04/94	07/94	11/94	01/95	04/95	07/95	10/95	01/96	04/96	07/96	10/96	01/97
Detected above PQL (mg/l)			*0.02*	*<0.010*	*<0.010*	*<0.004*	*<0.005*	*0.007*	*<0.005*	*<0.004*	*0*	*0*	*0*	*0*
PQL			*0.004*	*0.01*	*0.01*	*0.004*	*0.005*	*0.004*	*0.005*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*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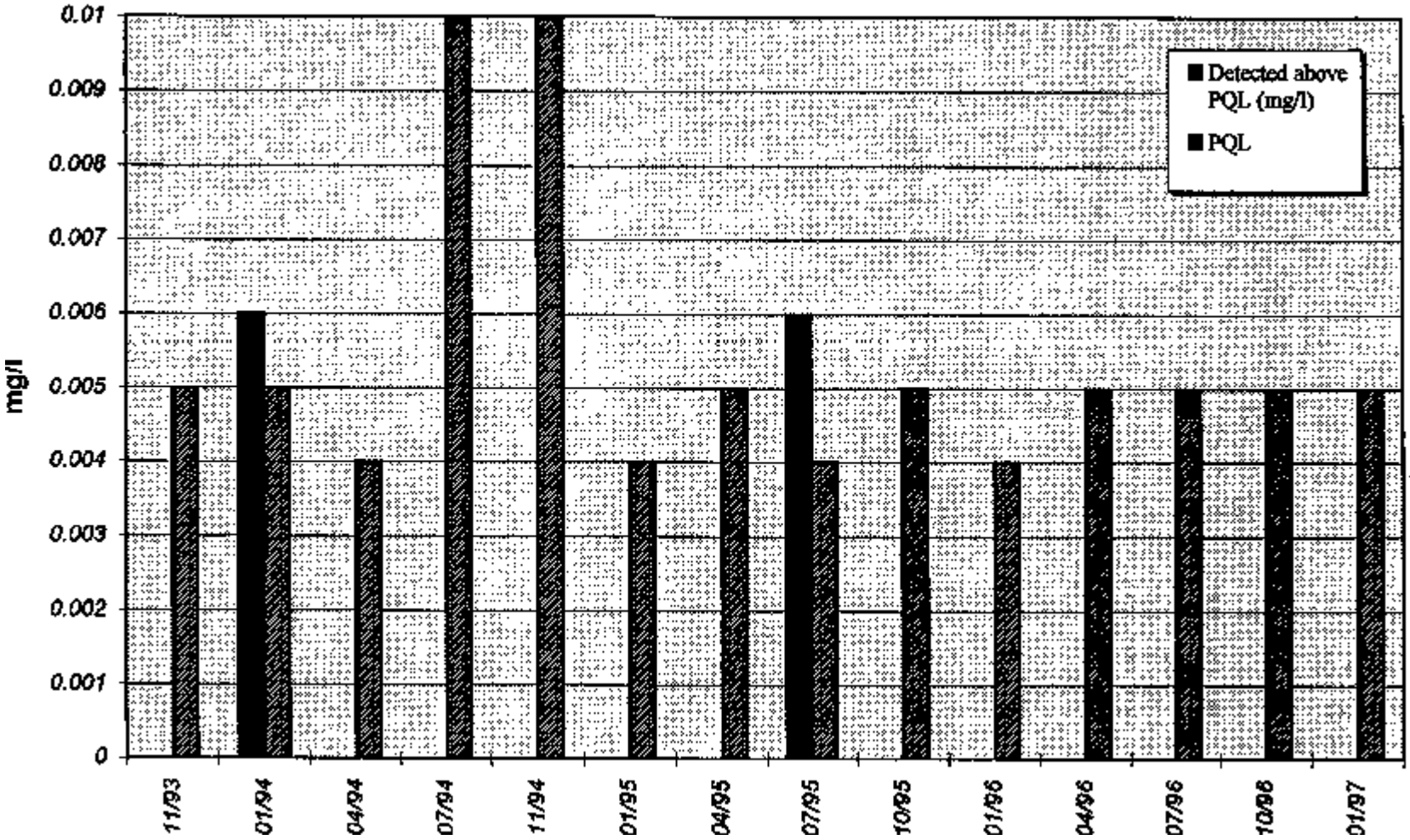
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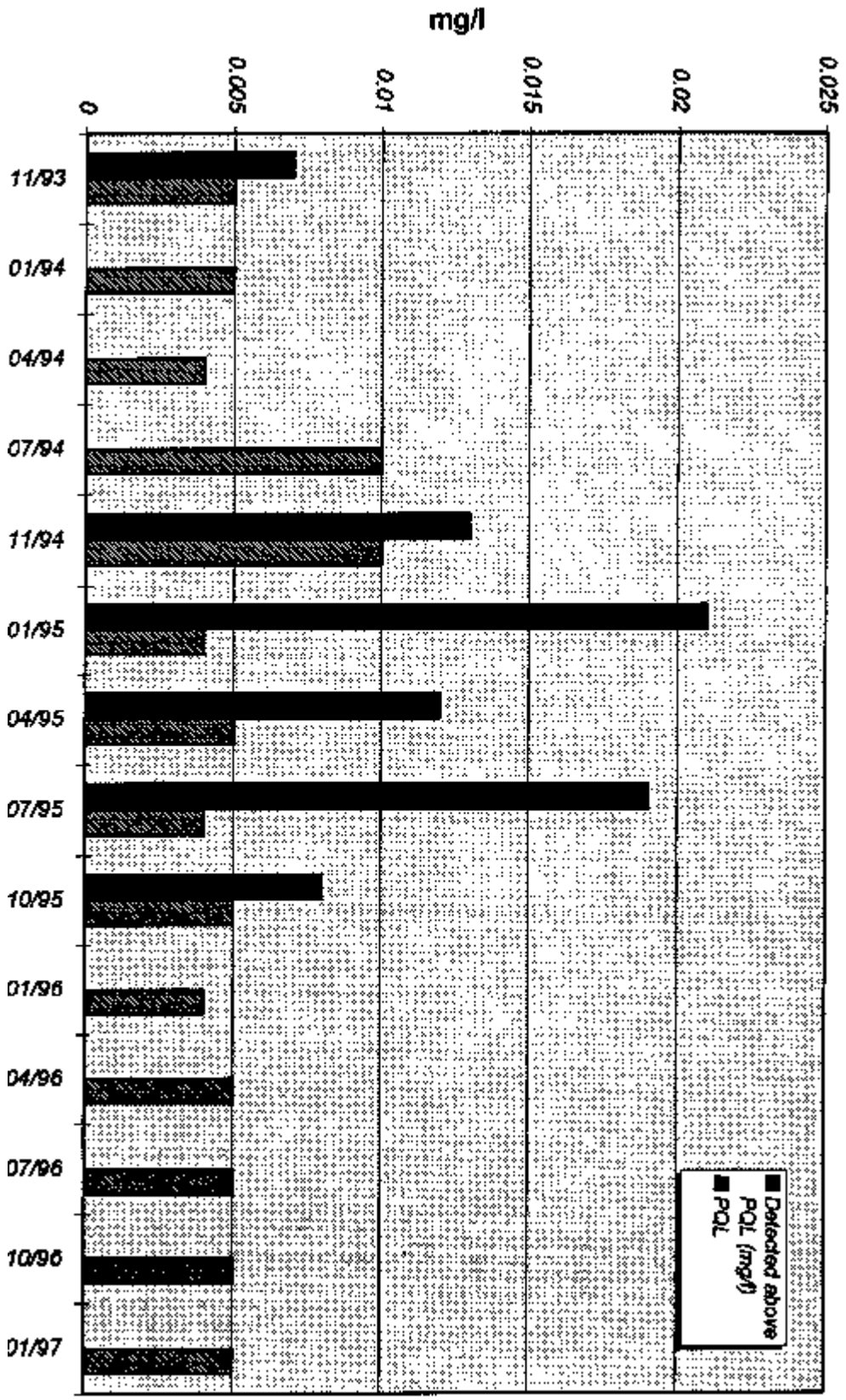
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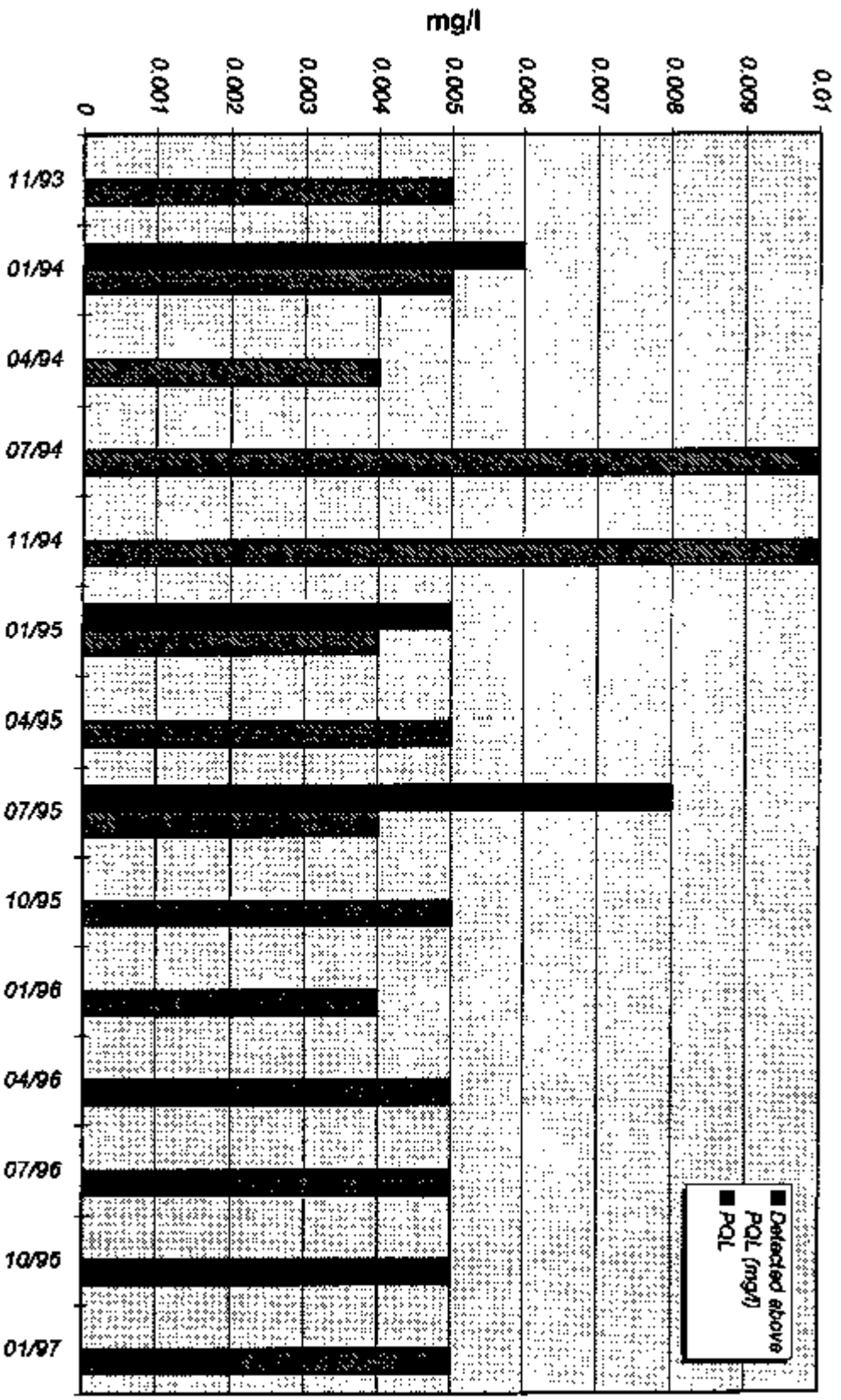
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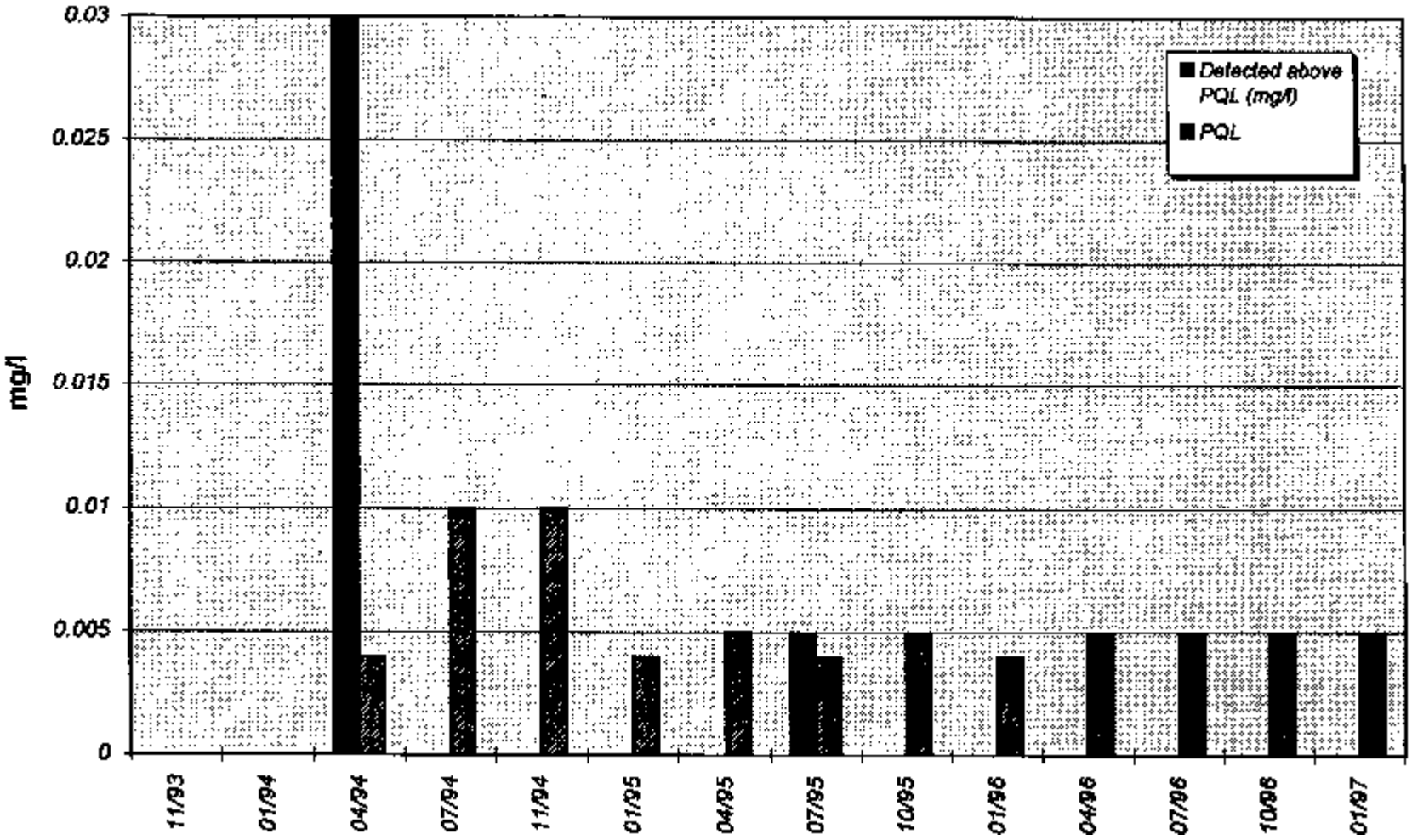
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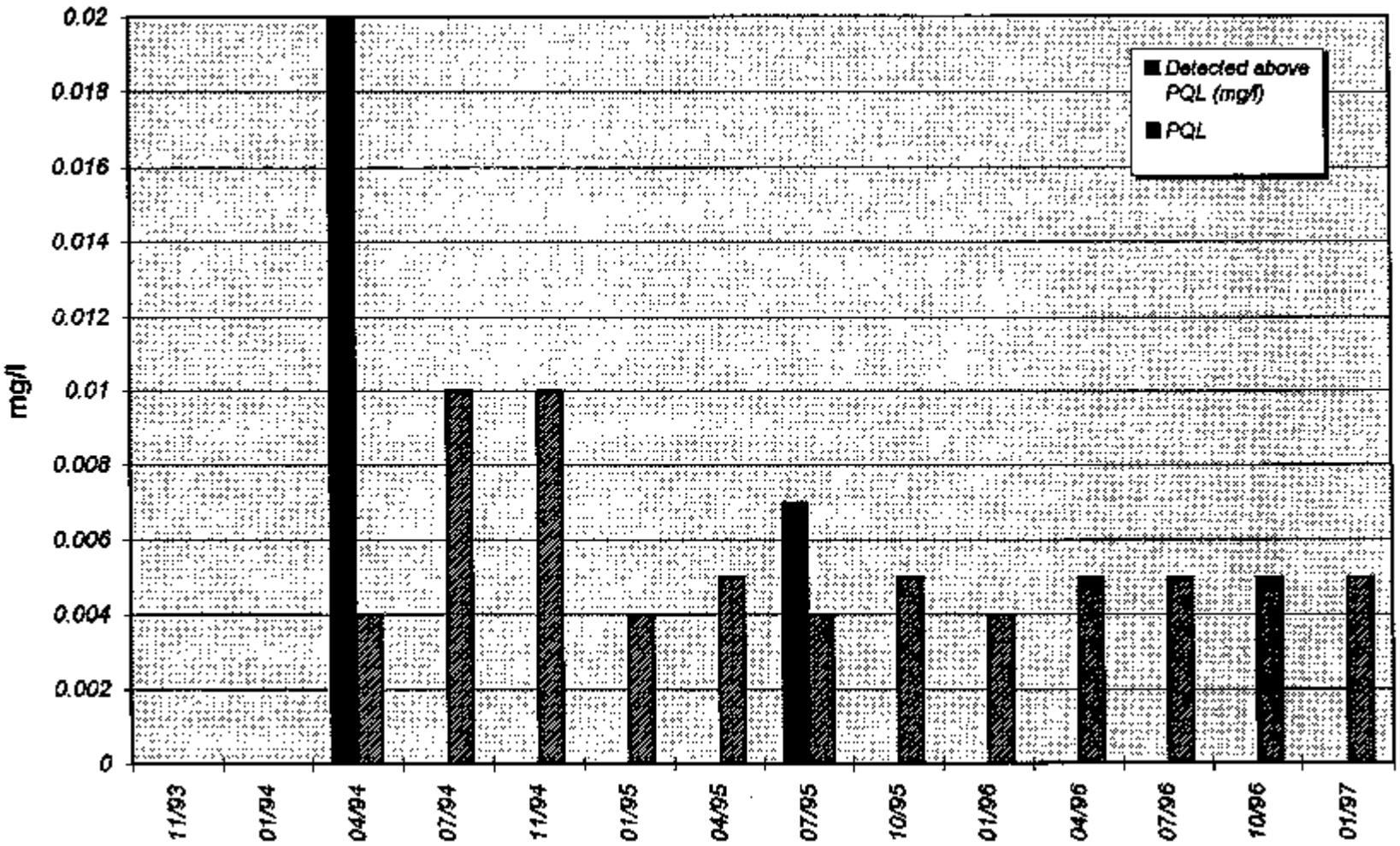
0.025
0.02
0.015
0.01
0.005
0
mg/l
Detected above PQL (mg/l)
PQL
11/93
01/94
04/94
07/94
11/94
01/95
04/95
07/95
10/95
01/96
04/96
07/96
10/96
01/97


0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
mg/l
Detected above PQL (mg/l)
PQL
11/93
01/94
04/94
07/94
11/94
01/95
04/95
07/95
10/95
01/96
04/96
07/96
10/96
01/97